

What is claimed is:

1 1. A keyboard control apparatus with a universal
2 serial bus (USB) interface for use in a notebook computer
3 having a plurality of keys, comprising:
4 a mapping unit for storing a plurality of key matrix
5 codes corresponding to said plurality of keys;
6 a shift register for generating a reference signal and
7 a plurality of scan output signals in accordance
8 with a clock signal and a start signal;
9 a key matrix circuit coupled to said shift register to
10 receive said plurality of scan output signals,
11 for outputting a plurality of scan input signals
12 and triggering one of said plurality of scan
13 input signals when a corresponding key of said
14 notebook computer is actuated, in which said
15 plurality of keys are rendered by means of said
16 plurality of scan output signals together with
17 said plurality of scan input signals;
18 an address generator coupled to said shift register to
19 receive said reference signal and coupled to said
20 key matrix circuit to receive said plurality of
21 scan input signals, for generating an address
22 signal in accordance with said reference signal
23 and said triggered scan input signal;
24 a selector separately coupled to said address generator
25 and said mapping unit, for receiving said address
26 signal and selecting one of said plurality of key
27 matrix codes which is designated to said address
28 signal; and

29 an interface converter coupled to said selector, for
30 converting said selected key matrix code into a
31 pair of differential signals compliant with the
32 universal serial bus (USB) specification.

1 2. The keyboard control apparatus of claim 1 wherein
2 said selector comprises a plurality of storage elements for
3 storing status data so that one of said key matrix codes is
4 selected from said mapping unit in accordance with said
5 address signal and said status data.

1 3. The keyboard control apparatus of claim 1 further
2 comprising a filter coupled to said key matrix circuit, for
3 filtering noise from said scan input signals and providing
4 respective filtered versions of said scan input signals to
5 said address generator.

1 4. The keyboard control apparatus of claim 3 further
2 comprising a buffer circuit coupled between said filter and
3 said address generator, for amplifying said respective
4 filtered versions of said scan input signals and providing
5 respective amplified versions of said scan input signals to
6 said address generator.

1 5. The keyboard control apparatus of claim 1 wherein
2 said shift register sequentially triggers said scan output
3 signals between assertions of said start signal, in which
4 trigger phase relationships between said scan output signals
5 are different.

1 6. The keyboard control apparatus of claim 1 wherein
2 said key matrix circuit comprises a plurality of row lines

3 to provide said scan input signals, respectively, and a
4 plurality of column lines to receive said scan output
5 signals, respectively, in which intersections of said row
6 lines and said column lines are arranged corresponding to
7 said keys of said notebook computer.

1 7. The keyboard control apparatus of claim 6 wherein
2 one of said intersections is activated to trigger a related
3 scan input signal when said corresponding key of said
4 notebook computer is actuated.

1 8. The keyboard control apparatus of claim 1 wherein
2 said mapping unit is formed of a non-volatile memory.

1 9. The keyboard control apparatus of claim 1 wherein
2 said mapping unit is formed of an Electrically Erasable
3 Programmable Read-Only Memory (EEPROM).

1 10. The keyboard control apparatus of claim 1 wherein
2 said interface converter transmits said selected key matrix
3 code in the form of said pair of differential USB signals to
4 south bridge logic of said notebook computer for further
5 processing.